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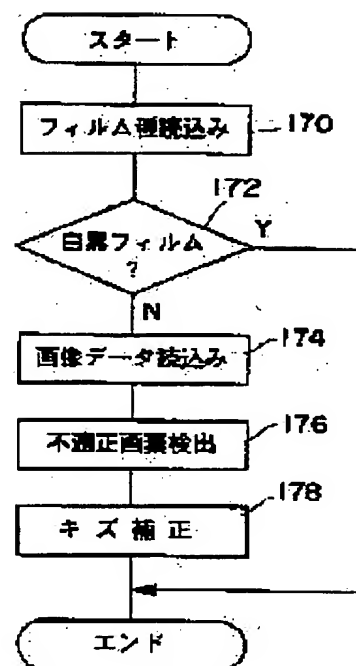
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(54) IMAGE PROCESSOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an image processor that can conduct image processing to correct improper pixels and conduct simplified image processing without correction improper pixels.

SOLUTION: Whether a film is a black/white photographic film is discriminated and in the case of the black/white photographic film, main processing is finished without conducting improper pixel correction processings. When the film is not a black/white photographic film, pixels of infrared ray IR luminous quantity data, whose IR luminous quantity is threshold or lower are detected as pixels (improper pixels) including dust adhesion or a flaw in a frame image, and image data corresponding to the improper pixels are corrected on the basis of fine scan image data placed around the improper pixels.



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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]

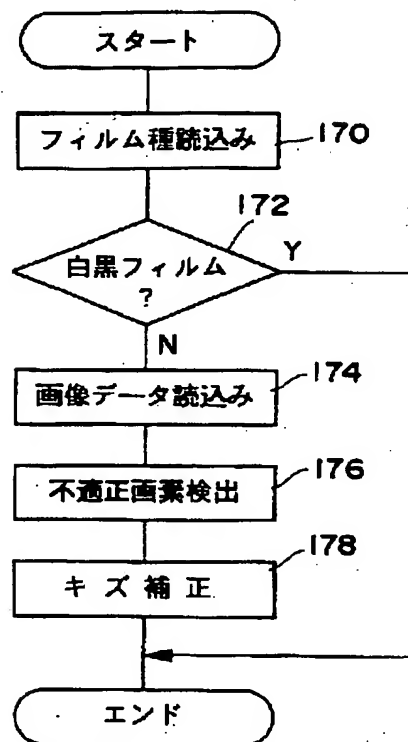
[Claim 1] An image reading means to read an image recorded on image recording data medium A detection means to detect a part for a defective part of an image which image data obtained by reading by said image reading means based on the non-light which irradiated the non-light, and penetrated or reflected this image recording data medium in said image recording data medium expresses A correction means to correct a defective part detected by said detection means of said image data It is the image processing system equipped with the above, and is characterized by having further a control means of said detection means and said correction means controlled to forbid one of actuation at least under predetermined conditions.

[Claim 2] Said control means is an image processing system according to claim 1 characterized by thing of said detection means and said correction means controlled to forbid one of actuation at least when a class of said image recording data medium is the thing of a predetermined class.

[Claim 3] Said control means is an image processing system according to claim 1 characterized by thing of said detection means and said correction means controlled to forbid one of actuation at least when a class of said image recording data medium is a black-and-white picture film.

[Claim 4] It is the image processing system according to claim 1 with which said image processing system is further equipped with the directions means for [of said detection means and said correction means] directing prohibition of one of actuation at least, and said control means is characterized by the thing of said detection means and said correction means which controls to forbid one of actuation at least when prohibition of actuation of said detection means and said correction means is directed through said directions means.

[Translation done.]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to an image processing system, and relates to the image processing system which performs an image processing based on the image data obtained by reading a subject-copy image in photoelectricity in details more.

[0002]

[Description of the Prior Art] The coma image recorded on manuscripts, such as a photographic film, is read in photoelectricity by reading sensors, such as CCD, image processings, such as enlarging or contracting and various amendments, are performed to the digital image data obtained by this reading, and the technology which forms an image in a record material by the laser beam modulated based on digital image data [finishing / an image processing] is known for recent years.

[0003] Thus, in the technology of reading a coma image in digital one by reading sensors, such as CCD, in order to realize accurate image reading, the coma image was read preparatorily (the so-called press can), the reading conditions (for example, the quantity of light, the charge storage time of CCD, etc. which irradiate a coma image) according to the concentration of a coma image etc. were determined, and the coma image is again read on the determined reading conditions (the so-called fine scan).

[0004] The method of diffusing the light from the light source and irradiating a manuscript is learned for the above-mentioned image reading means in order to reduce the effect on image reading by the dust, the blemish, etc. which it adhered to the manuscript.

[0005] However, effect to image reading by the dust or blemish of a manuscript cannot be completely removed only by irradiating the diffused light as mentioned above at a manuscript, but it is difficult to meet the demand of high-definition-izing to image reading in recent years. Then, in order to perform a higher-definition image processing, infrared light is irradiated at a manuscript, the quantity of light of the transmitted infrared light is read, the read quantity of light detects the pixel below a threshold as an unsuitable positive pixel by adhesion of a blemish and dust, and the image processing system which has the function (henceforth an "unsuitable positive pixel modify feature") to correct the unsuitable positive pixel concerned in the light image data read by the light is proposed (JP,6-78991,B).

[0006]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned image processing system, infrared light is irradiated about all manuscripts, the amount of transmitted lights of infrared light is read, when the quantity of light concerned is below a threshold, a corresponding pixel will be judged to be an unsuitable positive pixel by adhesion of a blemish and dust, and the unsuitable positive pixel concerned of the light image data read by the light will be corrected. Therefore, the case where the film which cannot detect an unsuitable positive pixel correctly since the amount of transmitted lights of infrared light changes according to image concentration like a black-and-white picture film is processed, When an image processing needed to be faithfully carried out for the effect by adhesion of a blemish and dust on a manuscript film based on the image data of a carrier beam as by a customer's needs, there was un-arranging [that the

special image processing system which is not equipped with an unsuitable positive pixel modify feature had to perform an image processing]. Moreover, an image processing including processing in which detect an unsuitable positive pixel using infrared light, and the unsuitable positive pixel concerned is corrected is complicated as compared with the image processing which does not include these processings, and requires long duration. Therefore, when an image processing needed to be carried out for a short time, there was un-arranging [that the special image processing system which is not equipped with an unsuitable positive pixel modify feature had to perform an image processing like the above].

[0007] This invention is made in order to cancel the above-mentioned trouble, is the image processing system equipped with the unsuitable positive pixel modify feature, and also aims performing the image processing simplified without correcting an unsuitable positive pixel at offering a possible image processing system.

[0008]

[Means for Solving the Problem] An image reading means to read an image with which this invention was recorded on image recording data medium in order to solve the above-mentioned trouble, A detection means to detect a part for a defective part of an image which image data obtained by reading by said image reading means based on the non-light which irradiated the non-light, and penetrated or reflected this image recording data medium in said image recording data medium expresses, With an image processing system equipped with a correction means to correct a defective part detected by said detection means of said image data, it has further a control means of said detection means and said correction means controlled to forbid one of actuation at least under predetermined conditions.

[0009] Since it is also controllable by the bottom of predetermined conditions not to correct said unsuitable positive image while being able to perform image amendment with a high precision according to this invention, since correction of said unsuitable positive image is possible, an image processing according to a class of read-ed image recording data medium or a customer's needs can be carried out with the same image processing system.

[0010] In addition, like claim 2, said control means may be a thing of said detection means and said correction means controlled to forbid one of actuation at least, when a class of said image recording data medium is the thing of a predetermined class, you may control to forbid one of actuation at least and a class of said image recording data medium is [of said detection means and said correction means] a black-and-white picture film like claim 3.

[0011] Moreover, this invention may be further equipped with a directions means for said image processing system to direct prohibition of actuation of said detection means and said correction means like claim 4, and said control means may be the thing of said detection means and said correction means controlled to forbid one of actuation at least through said directions means, when [of said detection means and said correction means] prohibition of one of actuation is directed at least.

[0012]

[Embodiment of the Invention] With reference to a drawing, the gestalt of operation of this invention is explained below.

[0013] The outline configuration of the digital language laboratory system 10 which starts this operation gestalt at drawing 1 and drawing 2 is shown.

[0014] As shown in drawing 1 , this digital language laboratory system 10 is constituted including the area CCD scanner 14, the image-processing section 16, the laser beam printer section 18, and the processor section 20, the area CCD scanner 14 and the image-processing section 16 are unified as the input section 26 shown in drawing 2 , and the laser beam printer section 18 and the processor section 20 are unified as the output section 28 shown in drawing 2 . The area CCD scanner 14 is connected with the image-processing section 16, the image-processing section 16 is connected with the laser beam printer section 18, and the laser beam printer section 18 is connected with the processor section 20.

[0015] The area CCD scanner 14 is for reading the coma image currently recorded on photographic films, such as a negative film and a reversal film, for example, can set the coma image of the photographic film of the photographic film of 135 sizes, the photographic film of 110

sizes and the photographic film (the photographic film of 240 sizes: the so-called APS film) with which the transparent magnetic layer was formed, 120 sizes, and 220 sizes (brownie size) as the reading object. In addition, the gestalt of this operation explains as digital language laboratory system 10 at the time of applying the photographic film 22 of 135 sizes.

[0016] While the image data (scanning image data) outputted from the area CCD scanner 14 is inputted, the image-processing section 16 The image data obtained by photography in digital camera 34 grade, the image data obtained by reading manuscripts (for example, reflection copy etc.) with a scanner 36 (flat bed mold), The image data which was generated by other computers and recorded on the floppy disk drive 38, the MO drive, or the CD drive 40, And it is constituted so that it may also be possible to input from the outside the communication link image data which receives through a modem 42 (for these to be hereafter named "file image data" generically).

[0017] Moreover, the image-processing section 16 is constituted so that the thing (for example, output to storages, such as FD, MO, and CD, or it transmits to other information management systems through a communication line) outputted to the exterior by making into an image file the image data which performed the image processing may also be possible.

[0018] The laser beam printer section 18 was equipped with the laser driver 54, and is equipped with the laser light source 52 of R, G, and B on this laser driver 54. The polygon mirror 58 and the ftheta lens 60 are installed on the optical axis of a laser light source 52, and printing paper 62 is installed in the image formation location of light with the ftheta lens 60.

[0019] (Configuration of an area CCD scanner) The configuration of the area CCD scanner 14 is explained below. The outline configuration of the optical system of the area CCD scanner 14 is shown in drawing 3.

[0020] This optical system is equipped with the light source 64 which consists of a metal halide lamp, a halogen lamp, etc., and the paraboloid-like reflector 24 is installed so that the light source 64 may be located in a focal location. The disc-like turret 66, a photographic film 22, and the lens unit 72 are installed so that it may become perpendicular to an optical axis L sequentially from a light source 64 side on the optical axis L of the light which emits light from the light source 64, and area CCD 30 is installed in the location where image formation of the light which penetrated the photographic film 22 is carried out by the lens unit 72. On the turret 66, color separation filters 70R, 70G, and 70B, ND filter 70ND, and infrared filter 70IR set a predetermined gap to a hoop direction, and are arranged. Image coma 22A and DX code 22B are memorized by the photographic film 22. Moreover, two or more pixels which detect light are superficially put in order along the longitudinal direction and the cross direction of a photographic film 22, and area CCD 30 has the function which accumulates a charge according to the light which all pixels received, and can read a coma image (two dimensions) electrically.

[0021] Next, the control system of the digital language laboratory system 10 is explained.

[0022] Drawing 4 is some block diagrams of the control system of the digital language laboratory system 10 shown in drawing 1.

[0023] The setup section 100 is constituted including the microcomputer which consists of CPU, ROM and RAM which are not illustrated, and input/output port. It connects with the storage sections 104, such as the image memory section 44, film data, etc. in the interior of the image-processing section 16, and this setup section 100 is connected also to the area CCD scanner 14 which is in the exterior of the image-processing section 16 further, keyboard 16K, and image display section 16M.

[0024] Next, an operation of this operation gestalt is explained.

[0025] First, if an operator inserts a photographic film 22 in a tape carrier package 78 and directs coma image reading initiation by keyboard 16K of the image-processing section 16, a tape carrier package 78 will start conveyance of a photographic film 22. If DX code 22B is read by the sensor which is not illustrated and the data about a film kind is memorized by the film data storage section 102, a tape carrier package 78 will read the image coma of the beginning of a photographic film 22, and will convey it to a location, and the press can manipulation routine shown in drawing 5 will start it.

[0026] At step 120, the read film judges whether it is a black-and-white picture film. When a film

is not a black-and-white picture film, at step 132, RGB light is irradiated in order at a photographic film 22, and an image coma is read. That is, although the light injected from the light source 64 irradiates a photographic film 22, a turret 66 is rotated at step 150 (drawing 6), color separation filter 70R is arranged on this optical axis L, parts for Mitsunari other than red (henceforth "R") are removed, and a photographic film 22 is irradiated with R light. The image of R component which penetrates a photographic film 22 and is condensed by the area sensor 30 at step 152 is read by the area sensor 30. A photographic film 22 is irradiated with a green (henceforth "G") light like the above by step 154, and the image of G component is read at step 156. Furthermore, by the step 158 as well as the above, a photographic film 22 is irradiated with a blue (henceforth "B") light, and the image of B component is read at step 160. A turret 66 is rotated at step 134, infrared filter 70IR is arranged on this optical axis L, parts for Mitsunari other than infrared radiation (henceforth "IR") are removed, and a photographic film 22 is irradiated by IR. The quantity of light of IR which penetrates a photographic film 22 and is condensed by the area sensor 30 at step 136 is read by the area sensor 30.

[0027] Next, at step 138, a photographic film 22 is conveyed by one coma by the tape carrier package 78, and it judges whether all reading of the coma image of a photographic film 22 was completed at step 140. When having not ended, the processing below return is repeated to step 132.

[0028] By decision of step 120, when a film is a black-and-white picture film, unlike the case of a color, a photographic film 22 is irradiated with a single light, reading processing of an image coma is performed, and exposure by IR and reading processing are not performed. That is, at step 122, a turret 66 is rotated, ND filter 70ND is arranged on an optical axis L, the quantity of light from the light source 64 is adjusted, and a photographic film 22 is irradiated. The light which penetrated the photographic film 22 and was condensed by the area sensor 30 at step 124 is read. At step 126, a photographic film 22 is conveyed by one coma by the tape carrier package 78, and it judges whether all reading of the coma image of a photographic film 22 was completed at step 128. When having not ended, the processing below return is repeated to step 122. This processing is ended when it is judged that all reading of the coma image of a photographic film 22 is completed at step 128 or step 140. In the case of a black-and-white picture film, since an above-mentioned procedure performs image read processing, image read down stream processing can be lessened.

[0029] The press can image data read by the area sensor 30 as mentioned above and the data about IR quantity of light are changed into digital data with A/D converter 32, and it transmits to the image memory section 44 in the image-processing section 16. Based on this press can image data and the data about IR quantity of light, the reading conditions at the time of the fine scanning and processing later mentioned in the setup section 100 are set up.

[0030] If a setup of said reading conditions is completed, a photographic film 22 will be conveyed towards reverse with the time of a press can, and fine scanning and processing will begin in order from the last coma to 1 coma eye. Although this fine scanning and processing are performed in the completely same procedure as press can processing (refer to drawing 5), the reading time amount of one coma is set up for a long time than the time of a press can, and that part reading resolution becomes high. Moreover, since the conditions (for example, photography conditions, such as an image pick-up image aspect ratio, an undershirt, Normal, excess, and super over, existence of speed light photography, etc.) of an image are recognized at the time of press can processing, it can read on proper reading conditions.

[0031] The fine scan image data read by the area sensor 30 as mentioned above and the data about IR quantity of light are changed into digital data with A/D converter 32, and it transmits to the image memory section 44 in the image-processing section 16. If an image memory 44 receives fine scan image data and the data about IR quantity of light, inaccurate pixel amendment processing of drawing 7 will begin.

[0032] Film kind data is read from the film data storage section 102 at step 170, and a film judges whether it is a black-and-white picture film at step 172. When it is a black-and-white picture film, this processing is ended without performing unsuitable positive pixel amendment processing. When it is not a black-and-white picture film, fine scan image data and the data

about IR quantity of light are read from the image memory 44 at step 174. The data about said IR quantity of light detects the pixel whose IR quantity of light is below a threshold at step 176 as a pixel (henceforth an "unsuitable positive pixel") with adhesion of the blemish in a coma image and dust. Based on the fine scan image data located in the perimeter of said unsuitable positive pixel at step 178, the image data corresponding to the unsuitable positive pixel concerned is amended, and this processing is ended.

[0033] The image data which passed through the above-mentioned processing is outputted to the laser beam printer section 18 as image data for record, after processing of various kinds of amendments in the color gradation processing section 46 of the image-processing section 16, the hyper-tone processing section 48, the hyper-sharpness processing section 50, etc. is performed.

[0034] In the laser beam printer section 18, a laser driver 54 is controlled, the laser beam modulated according to the image data for record (it once memorizes in an image memory 56) inputted from the image-processing section 16 is irradiated at printing paper, and an image is recorded on printing paper 62 by scan exposure (optical system which mainly used the polygon mirror 58 and the ftheta lens 60 with the gestalt of this operation). The printing paper 62 in which the image was recorded is conveyed by the processor section 20, and each processing of the color development, bleaching fixing, rinsing, and desiccation is performed. Thereby, an image is formed on printing paper 62.

[0035] In case the image processing system equipped with the unsuitable positive pixel modify feature performs an image processing according to the gestalt of this operation, by performing unsuitable positive pixel amendment processing corresponding to adhesion of the blemish in a photographic film and dust about a color film. While it is possible to raise the image quality of a photoprint, like monochrome film. Since the amount of transmitted lights of IR changes according to the image concentration currently recorded, in case the film which cannot detect an unsuitable positive pixel correctly is processed, said unsuitable positive pixel amendment processing cannot be performed, but the image processing system which can simplify an image processing can be offered.

[0036] In addition, although the film kind was identified by reading DX code 22B of a photographic film 22 with the gestalt of this operation, it is also possible for discernment of a film kind not to be limited to this method, and for an operator to input a film kind from keyboard 16K, and to identify a film kind by this input.

[0037] Moreover, although controlled by the gestalt of this operation to forbid actuation of unsuitable positive pixel amendment processing about a black-and-white picture film, it is not limited to this, and registers beforehand also about other film kinds, and it is also possible to control to forbid actuation of unsuitable positive pixel amendment processing.

[0038] Furthermore, it is also possible to control to forbid actuation of unsuitable positive pixel amendment processing irrespective of a film kind by inputting the directions of a purport with which an operator forbids actuation of unsuitable positive pixel amendment processing according to a customer's needs, for example, a demand that I want you to perform an image processing for a short time, and a demand even if a crack is on a manuscript film, that I want you to perform an image processing on a manuscript film faithfully. Thereby, it can respond to the time needs of the customer about photographic-film processing, and the needs about unsuitable positive pixel amendment.

[0039]

[Effect of the Invention] Since it has the control means controlled so that the image processing system equipped with the unsuitable positive pixel modify feature forbids actuation of unsuitable positive pixel amendment processing under predetermined conditions according to this invention as explained above, it has the outstanding effect that the image processing system which can also perform the image processing simplified with the image processing system equipped with the unsuitable positive pixel modify feature, without correcting an unsuitable positive pixel can be offered.
